Commission on Oil and Natural Gas Industry Safety

Meeting #1

August 13, 2015

Lawrence J. Malone
Director of Policy
Office of Governor Earl Ray Tomblin

Objectives

1. Ensure the safety of hardworking West Virginians at drilling sites, production facilities and pipelines across the state; and
2. Determine how to best to protect workers at natural gas operations while ensuring our workers have the proper training and skills to do their jobs in the safest, most effective way possible.

Objectives Cont.

3. Review current federal and state oil and natural gas workplace safety regulations;
4. Assess data on worksite incidents and accidents;
5. Examine training and industry best practices; and
6. Provide recommendations for improving workplace safety in the oil and natural gas industry in West Virginia.

Commission Members

- State Officials
- Representatives
  - Industry segments
  - Labor organizations
  - Trucking
- Public Service Commission
- Legislators

Scope of Worksite Safety Study

- Engineering/Site Preparation
- Exploration/Drilling/Production
- Hydraulic Fracturing
- Completion
- Gathering Systems
- Transmission Lines/Systems
- Distribution Lines and Facilities
- Natural Gas/Shale Processing Plants

Oil and Gas Extraction Activities:
Overview of Safety Hazards and Health Risks

Sources:

https://www.osha.gov/SLTC/oilgaswelldrilling/healthhazards.html

https://www.osha.gov/SLTC/oilgaswelldrilling/safetyhazards.html

- There are several hazards associated with drilling for and producing oil and natural gas.

- This presentation identifies the safety and health hazards that can cause serious injuries and death.

Safety Hazards

- Vehicle Collisions
- Struck-By / Caught-In / Caught-Between
- Explosions and Fires
- Falls
- Confined Spaces
- Ergonomic Hazards
- High Pressure Lines and Equipment
- Machine Hazards

Vehicle Collisions

- Well sites are often in in remote locations, requiring workers to travel in vehicles long distances.
- According to the Occupational Safety & Health Administration (OSHA), highway vehicle collisions are the leading cause of oil and gas extraction worker fatalities.
- Approximately 40% of fatalities in the industry are caused by vehicle collisions.

Struck-By/ Caught-In/ Caught-Between

- Workers are at risk of being struck-by, caught-in, or caught-between moving vehicles or equipment, falling equipment, and high pressure lines.

- OSHA estimates that 60% of all on-site fatalities are caused by workers being struck or caught.

Explosions and Fires

- Workers face the risk of fire and explosion due to ignition of flammable vapors and gases.
- Flammable gases, such as well gases, vapors, and hydrogen sulfide, can be released from wells, trucks, production equipment, and surface equipment such as tanks and shale shakers.
- Ignition sources include static, electrical energy, open flames, lightning, cigarettes, cutting and welding tools, hot surfaces, and frictional heat.

Falls

- Workers may be required to access platforms and equipment located off-ground.
- OSHA requires fall protection to prevent falls from the mast, drilling platform, and other elevated equipment.
- Due to the remote locations of may oil and gas well pads, a worker may be stranded without help after a fall.

Confined Spaces

- Workers are required to enter tanks, pits, excavated areas, containers, and other confined spaces.
- Hazards include ignition of flammable vapors, asphyxiation, and chemical exposure.

Ergonomic Hazards

- Risks include lifting heavy items, bending, reaching overhead, pushing and pulling heavy loads, working in awkward body postures, and performing the same or similar tasks repetitively.

High Pressure Lines and Equipment

- Workers are exposed to hazards from compressed gasses and high pressure lines.
- Internal erosion of lines may cause line leaks or bursts and connection failures may cause lines to fall.

Electrical and Other Hazardous Energy

- Workers may be exposed to uncontrolled electrical, mechanical, hydraulic, or other hazardous energy.
- Equipment that is not designed, installed, and maintained properly poses additional dangers.

Machine Hazards

- Workers may be exposed to a wide variety of rotating wellhead equipment, including top drives and Kelly drives, drawworks, pumps, compressors, catheads, hoist blocks, belt wheels, and conveyors.

- There is also the potential to be struck or caught between unguarded machines.

Health Hazards

- Hydrogen Sulfide
- Silica
- Diesel Particulate Matter
- Hazardous Chemicals
- Naturally Occurring Radioactive Material (NORM)
- Noise
- Fatigue
- Temperature Extremes

Hydrogen Sulfide

- Hydrogen sulfide is a colorless gas with the characteristic foul odor of rotten eggs; heavier than air, very poisonous, corrosive, flammable, and explosive.

- It can cause eye irritation, sore throat and cough, nausea, shortness of breath, fluid in the lungs, fatigue, loss of appetite, headaches, irritability, poor memory, dizziness, and nervous system failure, as well as preventing cellular respiration.

Silica

- Silica, often referred to as quartz, is a common mineral.
- The dust created by cutting, grinding, or drilling can contain crystalline silica particles.
- Respirable silica dust causes lung disease and lung cancer.
- A very small amount of airborne silica dust can create a health hazard.

Diesel Particulate Matter

- Diesel engines power a variety of machinery, vehicles, and equipment on a drilling site. Workers can be exposed to harmful levels of diesel particulate matter during the operation of these engines.

- Acute exposure may cause irritation to the eyes, nose, throat and lungs, as well as eliciting cough or nausea, exacerbating asthma, and causing neurological effects such as lightheadedness.

- Chronic exposure may cause lung inflammation and cellular changes in the lung and also lead to lung cancer.

Hazardous Chemicals

- Workers who use hazardous chemicals during work processes, especially during hydraulic fracturing, might be exposed to hazardous byproducts of oil and gas drilling.
- The degree of potential hazard depends on individual chemical properties and toxicity.
- Hazards include chemical burns from caustic substances and inhalation of toxic vapors.

Naturally Occurring Radioactive Material (NORM)

- NORMs consist of materials enriched with radioactive elements found in the environment, such as uranium, thorium, and potassium and any of their decay products, such as radium and radon.

- Workers at risk include those who handle pipes and equipment that might have been contaminated with NORM.

Noise

- Oil and gas workers can be exposed to harmful noise levels during equipment operation.
- Repeated extreme noise exposure can cause permanent hearing loss.
- Short term exposure can cause a temporary change in hearing or a ringing in the ears.
- Noise creates physical and psychological stress, reduces productivity, interferes with communication and concentration, and makes it difficult to hear warnings.
- Noise limits one's ability to hear high frequency sounds, understand speech, and communicate.

Fatigue

- Workers might experience fatigue due to long shifts and when working multiple days in a row.
- Impairs cognitive abilities.
- Worsens hand-eye coordination and makes it harder to communicate.

Temperature Extremes

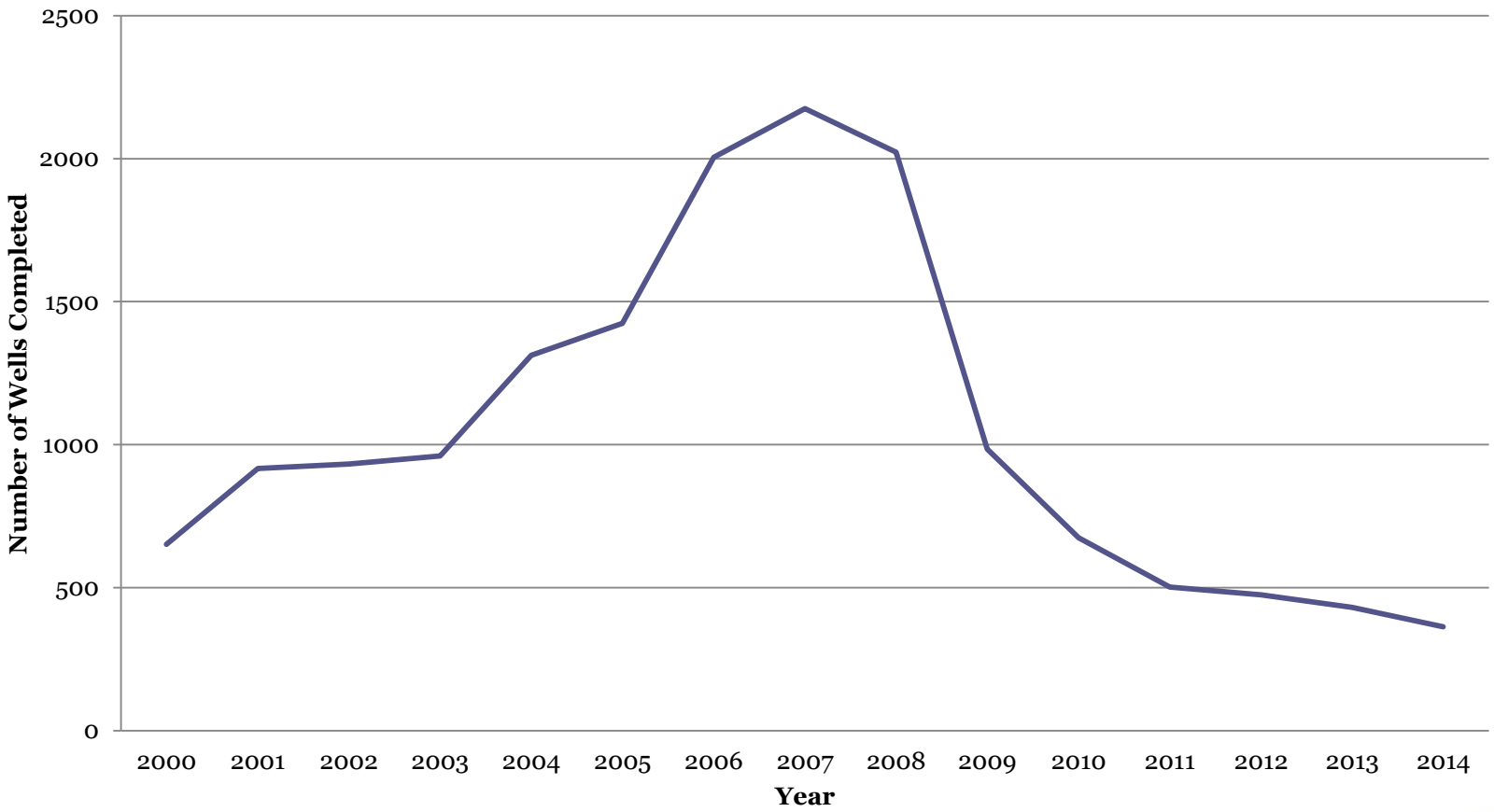
- Well-site workers are exposed to extreme temperatures and should take precautions to stay safe.
- Heat
  - Acute exposure can cause heat stroke, heat syncope, and other heat illness.
  - Chronic exposure can cause kidney, liver, heart, digestive system, and central nervous system failure, as well as skin problems.
- Cold
  - Acute exposure can cause hypothermia, frostbite, and trench foot.
  - Chronic exposure can have respiratory and cardiovascular effects.

Incidents and Accidents in West Virginia

Source:

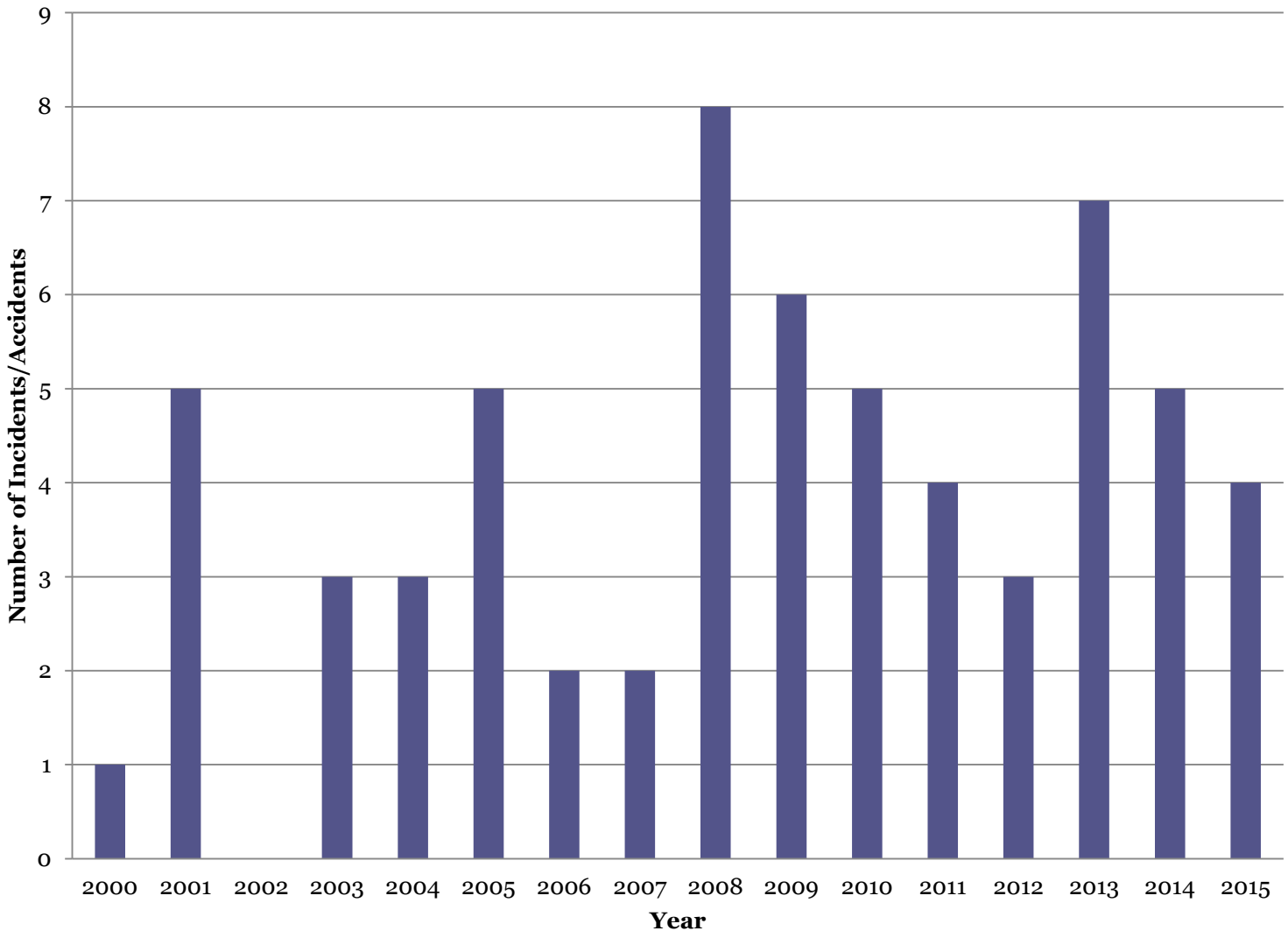
- WVDEP, Office of Oil & Gas

Permit Completions For New Wells

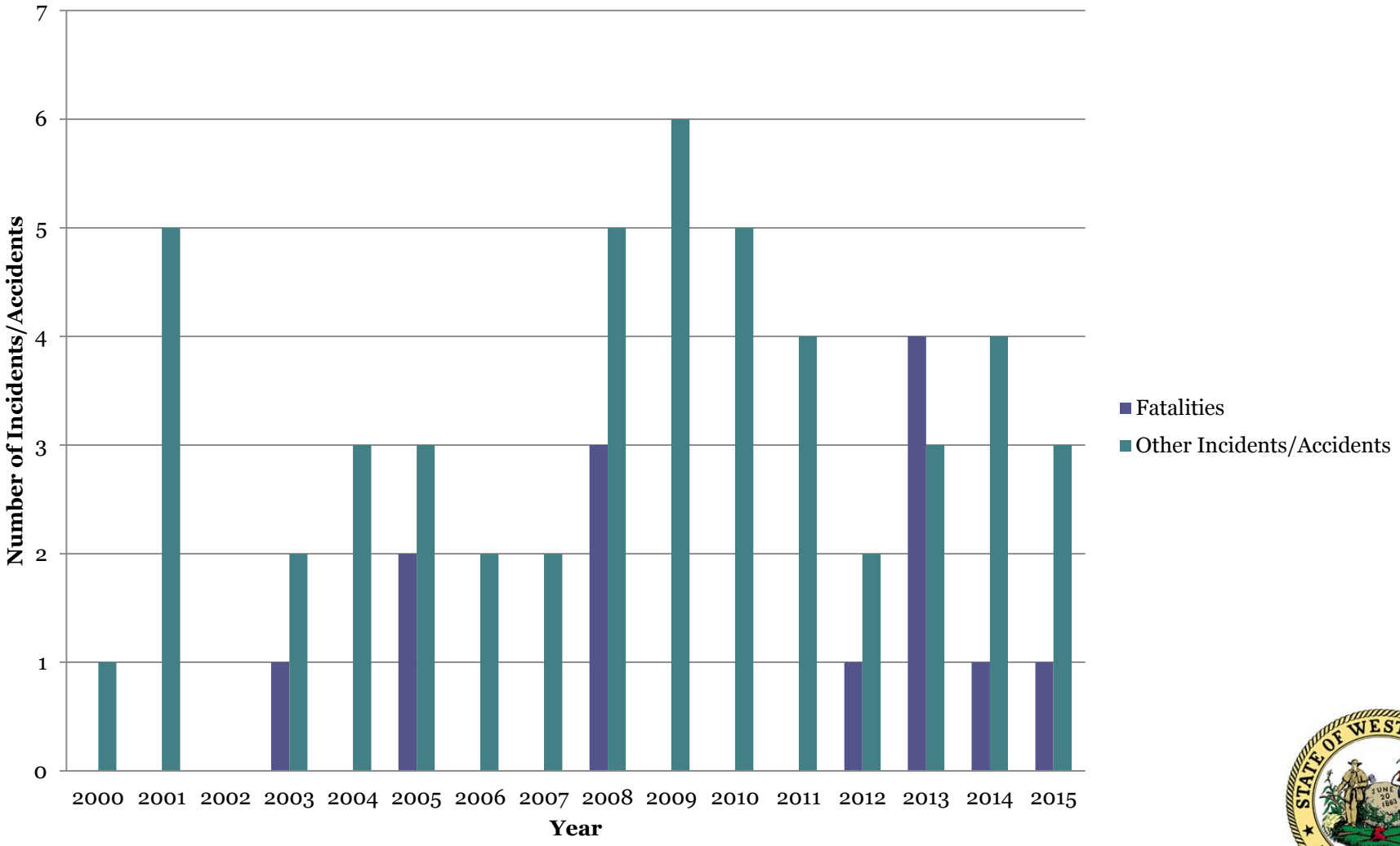


* - awaiting final 2014 numbers

Incidents/Accidents



Incident/Accident Type



Occurrences	Incident/Accident Type
35	Flash of gas / explosion / fire.
10	Worker struck by falling / dislodged equipment.
7	Moving machinery rolled over / crushed worker.
3	Employee trip / fall.
1	Well fluid hit worker.
1	Employee knocked second employee into mast.
1	Vapor exposure.
1	Suffocation.
1	Tongs backspin.
1	Tree fell and struck worker.
1	Heart attack.
1	Not specified.
63	**TOTAL Incidents/ Accidents 2000-2015**

Questions